NON-PUBLIC?: N
ACCESSION #: 8806230261
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Byron, Unit 2 PAGE: 1 of 4

DOCKET NUMBER: 05000455

TITLE: U2 Reactor Trip From HI-2 Steam Generator Level & Subsequent Loss of Offsite Power as a Result of Personnel Error
EVENT DATE: 10/02/87 LER #: 87-019-01 REPORT DATE: 06/17/88

OPERATING MODE: 1 POWER LEVEL: 13

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: T. Schuster, Assistant Technical Staff Supervisor
TELEPHONE #: 815-234-5441 Ext. 2244

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On October 2, 1987, at 0446, Unit 2 was returning to service. When Unit 2 was synchronized to the grid, the Steam Generator (SG) levels increased and caused a HI-2 S/G Level Trip. The HI-2 SG level was reached on SG 2C due to excessive "leak by" of the 2FW530 valve. The high S/G level caused a turbine trip and a subsequent reactor trip because reactor power was above 10%. An equipment operator (EO) was instructed to realign the switchyard ring bus after the trip. The EO opened the System Aux Transformer disconnects instead of the main power transformer disconnects. The safety related 4KV buses were deenergized causing the emergency diesel generators to start, reenergize the buses, and sequence the safe shutdown loads. The root cause of the loss of offsite power was due to personnel error. The EO opened the wrong disconnect. The corrective actions are as follows:
- Disciplinary action was taken with the EO.
- Administrative procedures were revised to ensure that no switchyard operations are performed without a second individual present.
- Permanent, descriptive labels have been placed on MPT & SAT switchyard disconnects.
- A walk through of the switchyard with Division Superintendent of Power Supply to demonstrate proper operations and communications was conducted.
- The SAT disconnects are locked with unique locks for each unit.
- A checklist has been developed that formalizes checks to be made prior to disconnect operation.

- Annual high voltage switching requalification training has been revised to include actual switching operations.
- Modifications were installed in 1985 that reduced the undervoltage trip setpoint on all process and area radiation monitors from 100 VAC to 90 VAC. Past experience indicates that the setpoint modification has reduced the monitor's sensitivity to voltage transients caused by large pump starts and most grid disturbances. No further corrective action will be taken since this is considered an isolated occurrence.
- Main Feedwater Regulating Valve 2FW530 was repaired, eliminating the "leak by" problem.

(End of Abstract)

A. PLANT CONDITIONS PRIOR TO EVENT:

Event Date/Time 10/2/87 / 0446

Unit 2 MODE 1 - Power Operations Rx Power 13%
RCS (AB) Temperature/Pressure Normal Operating

B. DESCRIPTION OF EVENT:

On October 2, 1987, at 0446, Unit 2 was returning to service following a Reactor Trip which occurred on October 1. An Equipment Operator (EO) and a Shift Foreman (SF) went out to the switchyard to verify that all 3 phases of Air Circuit Breaker (ACB) 10-11 and Oil Circuit Breaker (OCB) 11-12 were opened, isolating the main generator in preparation for synchronization. In addition, the Main Power Transformer (MPT) disconnect for Unit 2 was to be closed by the EO. After completing these manipulations the EO and the Shift Foreman went to the relay house and completed the required log book entries.

In the Main Control Room (MCR), one Reactor Operator was maintaining steam generator levels with the 2C Steam Generator in manual level control. A second Reactor Operator was preparing to synchronize the generator to the grid.

As the Unit was synchronized the steam generator levels started to quickly increase. The three steam generators that were in automatic level control stabilized at approximately 60 percent. The 2C Steam Generator level, which was in manual, continued to increase. The Operator closed the 2FW039C valve and opened the Startup Feedwater Pump Recirculation Valve to try to reduce the water supplied to the 2C Steam Generator. Before these valves could fully stroke the steam

generator reached P-14, the Hi-2 Turbine Trip Setpoint. Since the Unit was greater than 10 percent power, P-7, a Reactor Trip occurred at 0446.

The Emergency Procedures were entered and properly performed. Per these procedures, the EO and the Shift Foreman were called on the radio to verify that all 3 phases of ACB 10-11 and OCB 11-12 were opened. The next required step was to realign the ring bus. The EO was then called on the radio to open the Unit 2 345KV Main Power Transformer disconnect. Throughout all the radio communications the EO repeated back all messages to verify proper and complete communication. The EO understood the instructions. Both the EO and the Shift Foreman approached the Station Auxiliary Transformer (SAT) manual disconnect when the Shift Foreman was paged. He returned to the relay house. The Equipment Operator continued on to the SAT manual disconnect and opened it at 0501. The EO mistakenly opened the wrong transformer disconnect causing the loss of offsite power.

The Shift Foreman heard what sounded like an explosion and went out to where the EO was standing. The Equipment Operator was unharmed.

In the Main Control Room, the lights went out, the Unit 2 Diesel Generators automatically started and the safe shutdown loads sequenced on the diesel generators. The SRO entered Byron Operating Abnormal Procedure (BOA) Elec-4, Loss of Offsite Power For Mode 3 or 4. All steps were properly performed. The SRO in the Control Room used BEP 0.2, Natural Circulation Cooldown, to cool down the primary loop.

Due to the loss of offsite power at 0501, a power fluctuation was felt on Unit 1. Both the 1RT-AR011 and 1RT-AR012 radiation monitors went into alarm condition, causing a Containment Ventilation Isolation on Unit 1. In addition, the Unit 1 Process Computer and the Unit 1 DEH computer stopped operating.

The Unit 1 Process Computer was restored to normal operation at 0740. However, the administrative requirement to report a loss of Unit 1 emergency assessment capability within 1 hour of a 2 hour loss of the Process Computer was not met.

Due to recovery actions already in progress, action a. of Limiting Conditions for Operation (LCO) 3.8.1.1 was not complied within the 1 hour specified. "Normal and Alternate Offsite AC Power Availability" Surveillances 1/2BOS 8.1.1.1.a-1 were performed initially at 0721, when they should have been completed by 0601.

An Unusual Event was declared at 0538. An examination of the Unit 2 SAT disconnect showed no significant damage to the disconnect. The Unit 2 SAT disconnect was reclosed, the Unit 2 SAT was reenergized at 1328 and the Unusual Event was terminated at 1417.

C. CAUSE OF EVENT:

The root cause of the Loss of Offsite Power was due to a personnel error by the Equipment Operator who opened the wrong transformer disconnect. A contributing factor was the confusing disconnect labeling. The MPT disconnect was labeled "TR2 345KV TR DISC". The SAT disconnect was labeled "TR242 345KV TR DISC". The message from the load dispatcher and the center desk operator was to open the Main Power Transformer 345KV disconnect. The labeling on the disconnects was not consistent with the nomenclature used to identify the disconnect.

The root cause of the Reactor Trip was the "leak by" of the Main Feedwater Regulating Valve 2FW530 for the 2C Steam Generator. The "leak by" of this valve allowed excess water into the 2C Steam Generator causing the High-2 Steam Generator level condition. The cause of the valve "leak by" was a misadjusted valve stroke. This misadjustment was due to a breakdown of threads in a threaded block which is part of the valve stem assembly. The root cause of the thread breakdown is indeterminable and considered an isolated failure.

The root cause of the Unit 1 Containment Ventilation Isolation was the voltage transient felt by the 1RT-AR011 and 1RT-AR012 radiation monitors caused by the Unit 2 loss of offsite power. When power to the radiation monitors is interrupted, an alarm condition is generated. This alarm generates a Containment Ventilation Isolation signal.

The root cause of the loss of the Unit 1 Process Computer was the voltage transient caused by the Unit 2 loss of offsite power. The Unit 1 Process Computer had been supplied by "dirty" power during the event. Its normal inverter power supply was inoperable awaiting replacement parts. In May, 1988, the Unit 1 Process Computer power supply was switched to the preferred inverter.

D. SAFETY ANALYSIS:

There was no impact on the plant or public safety. The Unit 2 Diesel Generators both started as designed. All safe shutdown loads were sequenced on the buses supplied by the diesel generators as designed. The Unit was cooled down on natural circulation. The operators properly verified all natural circulation cooldown parameters per procedure.

E. CORRECTIVE ACTIONS:

The corrective actions are as follows:
- Disciplinary action was taken with the EO.
- "Division Load Dispatcher Directed Switching Order Activities Administrative Procedure" (BAP 330-9) has been revised to ensure that switchyard operations are performed while a second individual is present.
- Permanent, descriptive labels have been placed on MPT and SAT switchyard disconnects.

E. CORRECTIVE ACTIONS: (Continued)

- A walk through of the switchyard with Division Superintendent of Power Supply to demonstrate proper operations and communications was conducted.
- The SAT disconnects are locked with unique locks for each unit.
- A checklist has been developed that formalizes checks to be made prior to disconnect operation.
- Annual high voltage switching requalification training has been revised to include actual switching operations.
- Modifications were installed in 1985 that reduced the undervoltage trip setpoint on all process and area radiation monitors from 100 VAC to 90 VAC. Past experience indicates that the setpoint modification has reduced the monitor's sensitivity to voltage transients caused by large pump starts and most grid disturbances. No further corrective action will be taken since this is considered an isolated occurrence.
- The faulty Main Feedwater Regulating Valve (2FW530) stem assembly was replaced, and the valve stroke was properly set to correct the "leak by" problem. The valve was returned to service on October 7, 1987.
- Because of the delay in reporting the loss of the Unit 1 Process Computer, the method of tracking degraded equipment status during emergency plant events was reviewed. As a result a new section was added to the "Plant Status" form used during GSEP events.
- No corrective action will be performed as a result of the delayed performance of Surveillances 1/2BOS 8.1.1.1.a-1. In conjunction with the recovery actions and reporting activities, the surveillance was performed as soon as possible.

F. PREVIOUS OCCURRENCES:

LER NUMBER TITLE

NONE

G. COMPONENT FAILURE DATA:

a) MANUFACTURER NOMENCLATURE MODEL NUMBER MFG PART NUMBER
Not Applicable

b) RESULTS OF NPRDS SEARCH:
Not Applicable

ATTACHMENT # 1 TO ANO # 8806230261 PAGE: 1 of 1

Commonwealth Edison
Byron Nuclear Station
4450 North German Church Road
Byron, Illinois 61010

DATE: June 17, 1988

LTR: BYRON 88-0317

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Dear Sir:

The enclosed Licensee Event Report Supplement from Byron Generating Station is being transmitted to you to provide additional information.

This report is number 87-019-01; Docket No. 50-455.

Very truly yours,
/s/
R. Pleniewicz
Station Manager
Byron Nuclear Power Station

RP/RJP/bb (1921M/0206M)

Enclosure: Licensee Event Report No. 87-019-01

cc: A. Bert Davis, NRC Region III Administrator
P. Brochman, NRC Senior Resident Inspector
INPO Record Center
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